ARJUNA

JEE

LECTURE NO. - 4

Basic Math

MSM SIR

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KAHAANI AB TAK

① '$\geqslant$' '$\leqslant$' → CLOSED BRACKET

(FUFA CONCEPT)

↳ special Dhyan Rakhna ₹1

② '$>$' '$<$' → Open BRACKET.

Q. $a^2 + ax < 1 - x$. Solve for x. (HW DISCUSSION) 'AKB SAWAAL' ?

$ax + x + a^2 - 1 < 0$

$(a+1)x + (a^2-1) < 0$

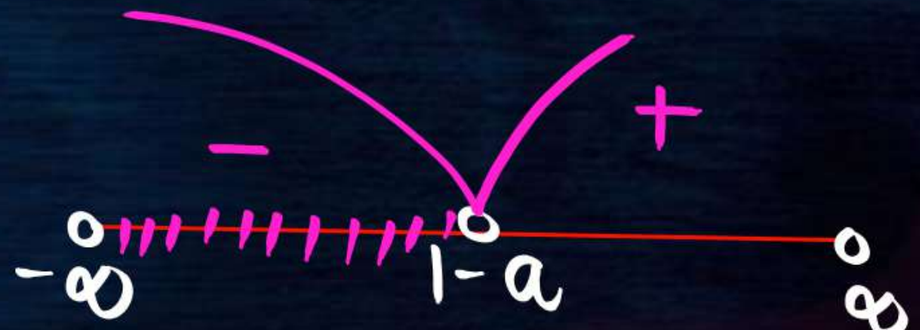
Leading coeff. se Matlab ₹|

'x' mai linear ₹|

Case 1 ⇒

$a+1 > 0$

OR, $a > -1$



$x \in (-\infty, 1-a)$

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Case 2 → $a+1=0$

$a=-1$

$(-1+1)x+((-1)^2-1)<0$

$0<0$ Invalid

$x\in\phi$

Case 3 ⇒ $a+1<0 \Rightarrow a<-1$

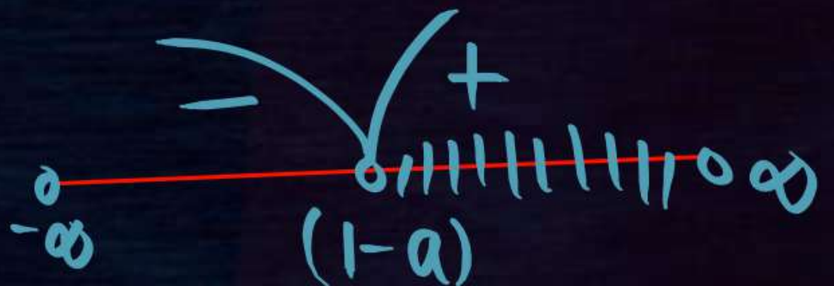
$(a+1)x+(a^2-1)<0$

Negative

$\Rightarrow -(a+1)x-(a^2-1)>0$

Positive

$x\in(1-a,\infty)$



final ans →

If $a+1>0$, $x \in (-\infty, 1-a)$

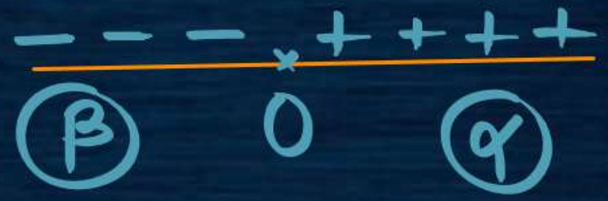
If $a+1=0$, $x \in \phi$

If $a+1<0$, $x \in (1-a, \infty)$

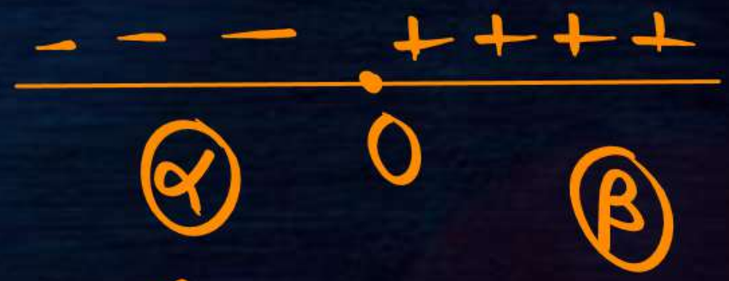
Q. If α & β lies on opposite sides of "zero" on number line then

DPP1, Q9

1. $\alpha > \beta$
2. $\beta > \alpha$
3. $\alpha\beta < 0$
4. $\alpha\beta > 0$



$\alpha > 0$
$\beta < 0$
$\alpha > \beta$
$\alpha\beta < 0$



$\alpha < 0$
$\beta > 0$
$\beta > \alpha$
$\alpha\beta < 0$

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Q. Values of x satisfying $-1 < \frac{2x}{x-1} \leq 4$

DPP 2, Q7

Double Inequality → Complex Numbers ?

1. $x \in \left(-\infty, \frac{1}{3}\right) \cup (1, \infty)$
2. $x \in \left(-\infty, \frac{1}{3}\right) \cup (2, \infty)$
3. $x \in \left(-\infty, \frac{1}{3}\right) \cup [2, \infty)$
4. $x \in \left(-\infty, \frac{1}{3}\right) \cup [2, \infty) \cup \{1\}$

$-1 < \frac{2x}{x-1}$ $\cap$ $\frac{2x}{x-1} \leq 4$

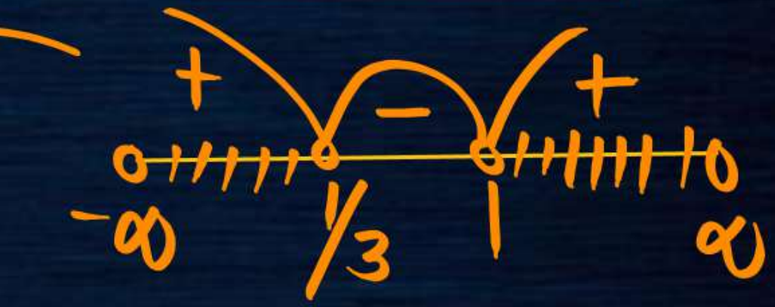
$\frac{2x}{x-1} + 1 > 0$

$\frac{2x}{x-1} - 4 \leq 0$

$\frac{3x-1}{x-1} > 0$, $x \neq 1$

$\frac{2x-4x+4}{x-1} \leq 0$

$\frac{(-2x+4)}{(x-1)} \leq 0$, $x \neq 1$



$x \in \left(-\infty, \frac{1}{3}\right) \cup (1, \infty)$

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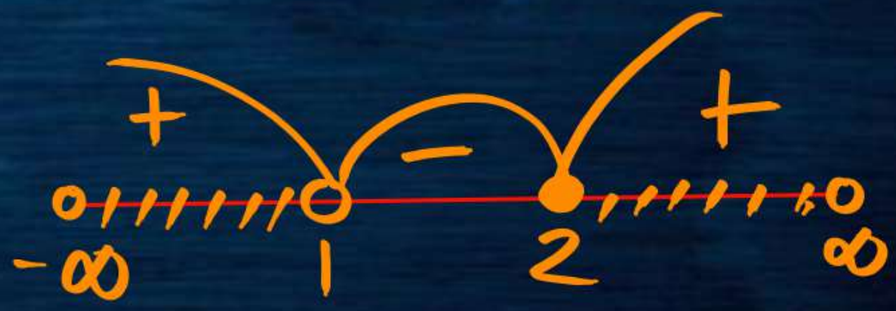
$$\frac{-(-2x+4)}{x-1} \geq 0$$

$$\frac{2x-4}{x-1} \geq 0$$

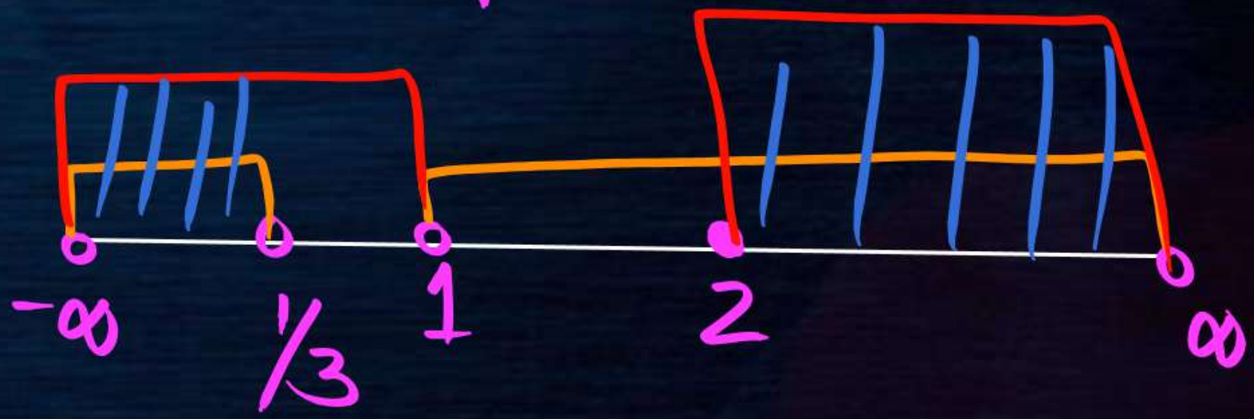
$x \neq 1$

$x = 2$



✓ $x \in (-\infty, 1) \cup [2, \infty)$

Intersection →



final ans

$x \in (-\infty, \frac{1}{3}) \cup [2, \infty)$

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QUADRATIC KA GYAAN

IF $D<0$, Then Quadratic cannot be factorized into linear factors.

Reason in Quadratic factors

Q→ Find the value of 'q' if "x^2+x+q" cannot be factorized into linear factors.

Soln → $D = b^2 - 4ac$

$= (1)^2 - 4(1)(q) = (1-4q)$

$D < 0$

$1 - 4q < 0 \Rightarrow 1 < 4q \Rightarrow q > \frac{1}{4}$ OR $q \in \left(\frac{1}{4}, \infty\right)$

Ans

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Thank – You

- FUTURE IIT-IANS